01-24-00 A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of John P. Carrico and Frank T. Stoner

Serial No.: Not yet assigned Group Art Unit:

Filed: Herewith Examiner:

For: **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS**

Assistant Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C. 20231

Dear Sir:

Enclosed please find the following:

1. Specification, abstract and claims (3 independent, 6 dependent, 9 total)(14 pages);
2. Informal drawings (4 figures, 4 sheets);
3. Declaration and Power of Attorney;
4. Assignment with Recordation Sheet;
5. Verified Statement Claiming Small Entity Status - Independent Inventor;
6. Verified Statement Claiming Small Entity Status - Small Business Concern;
7. One check in the amount of $385.00 ($345.00 for filing the application and $40.00 for the assignment); and,
8. Certificate of Express mailing.

The Commissioner is hereby authorized to charge any fee deficiency, or credit any overpayment, to Deposit Account No. 18-1579. The Commissioner is also authorized to charge Deposit Account No. 18-1579 for any future fees connected in any way to this application. Two copies of this letter are enclosed.

Respectfully submitted,

Kevin L. Pontius
Registration No. 37,512
Roberts Abokhair & Mardula, LLC
11800 Sunrise Valley Drive, Suite 1000
Reston, VA 20191-5302
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January 21, 2000 Atty. Docket No. 2493-025

CERTIFICATE OF EXPRESS MAILING

Express Mail Mailing Label Number EL528294847US

Date of Deposit: January 21, 2000

I hereby certify that the patent application of John P. Carrico and Frank T. Stoner for a **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS** including the specification, abstract, and claims (3 independent, 6 dependent, 9 total)(14 pages); informal drawings (4 figures, 4 sheets); declaration and power of attorney; an assignment together with a recordation cover sheet; Verified Statement Claiming Small Entity Status - Small Business Concern; Verified Statement Claiming Small Entity status - Independent Inventor; and a check in the amount of $385.00 ($345.00 to cover the filing fee and $40.00 to record the assignment), are being deposited with the United States Postal Service for "Express Mail" service under 37 C.F.R. § 1.10 on the date indicated above and are addressed to the Assistant Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

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VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR	Docket Number 2493-025

Applicant or Patentee: John P. Carrico and Frank T. Stoner

Serial or Patent No.: Not Yet Issued

Filed or Issued: Herewith

Title: **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

☒ the specification filed herewith with title as listed above.

☐ the application identified above.

☐ the patent identified above.

I have not assigned. granted, conveyed or licensed and am under no obligation under convey or law to assign, grant, convey or license. any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that had made the invention, or to any concern which would not qualify as a business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(c).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☐ No such person, concern, or organization exists.

☒ Each such person, concern or organization is listed below.

Analytical Graphics, Inc.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate.(37 CFR 128(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made an information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

John P. Carrico	Frank T. Stoner	
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
John P. Carrico	Frank T. Stoner	
Signature of inventor	Signature of inventor	Signature of inventor
14 Jan. 2000	14 Jan. 2000	
Date	Date	Date

PTO/SB/10(11-90)

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c))--SMALL BUSINESS CONCERN

Docket Number 2493-025

Applicant or Patentee: John P. Carrico and Frank T. Stoner
Serial or Patent No.: Not Yet Issued
Filed or Issued: Herewith
Title: **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS**

I hereby declare that I am

☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Analytical Graphics, Inc.
ADDRESS OF SMALL BUSINESS CONCERN 325 Technology Drive, Malvern, PA 19355

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern. including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

☒ the specification filed herewith with title as listed above.
☐ the application identified above.
☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statements averring to their status as small entities, and no rights to the invention are held by any person. other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization having any rights in the invention is listed below:

☒ no such person, concern or organization exists.
☐ each such person, concern or organization is listed below.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlements to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.289(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Paul Graziani
TITLE OF PERSON IF OTHER THAN OWNER President
ADDRESS OF PERSON SIGNING 325 Technology Drive, Malvern, PA 19355
SIGNATURE Paul L. Graziani DATE 1-14-00

Title of the Invention: Method and Apparatus for Sequentially Profiling and Solving Problems in Space Mission Analysis

Inventors: John P. Carrico, Frank T. Stoner

RELATED APPLICATIONS

This application claims priority from U.S. provisional patent application no. 60/116,546, filed January 21, 1999.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to orbital planning. More particularly, this invention relates to a system and method for orbital planning that allows iterative calculations of orbital parameters to be accomplished in an automated way with one parameter solution serving as input to the next parameter's calculation.

2. Background Art

In the process of a space mission analysis, the analyst must often perform repetitive calculations. Frequently such calculations require the analyst to set up a problem (or "case"), run the problem, and then review the results. After reviewing the results, the analyst will set up another problem based on those results and run the calculations again. Typically, the problems are addressed and solved in order of increasing complexity.

An example of this process is determining how long to fire a spacecraft's engines, and in what direction, in order to place the spacecraft in a desired orbit. This problem can be broken down into two sub-problems. First, the analysts may wish to determine the appropriate duration of firing to achieve the desired orbit in part. After this problem is

solved, and using its solution, the analyst can solve the combined problem of determining the duration *and* direction of the engine firing.

It has generally been necessary to use computer languages and scripts to carry out the sequential profiling and solving of a complex space mission analysis problem. That process is cumbersome and time consuming and, depending on the programming background of the analyst, may require him or her to learn a new programming or script language. The prior art includes one program that makes use of a graphical user interface (GUI) for the individual profiling of a problem, but each problem in a sequence of problems must be profiled and processed manually.

It would therefore be useful to have the ability to solve profiles for space mission planning in an automated way. Ideally a system that allows a user to establish a series of sub-profiles, solve those sub-profiles and provide the response to the next sub-profile problem would give the analyst the most flexibility in performing mission analysis.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method that provides an analyst with the ability to solve profiles for space mission planning.

It is another object of the present invention to provide a computer system that automatically enables an analyst to solve profiles for space mission planning.

It is still another object of the present invention to provide a computer program product that enables a computer to provide an analyst with the ability to automatically solve profiles for space mission planning.

It is an object of the present invention to provide a method that provides an analyst with the ability to establish a series of sub-profiles, and which solves each of those

sub-profiles and provides that solution as a basis for solving the next sub-profile in sequence.

It is another object of the present invention to provide a computer system that provides an analyst with the ability to establish a series of sub-profiles, and which solves each of those sub-profiles and provides that solution as a basis for solving the next sub-profile in sequence.

It is still another object of the present invention to provide a computer program product that enables a computer to provide an analyst with the ability to establish a series of sub-profiles, and which solves each of those sub-profiles and provides that solution as a basis for solving the next sub-profile in sequence.

Some of the above objects are obtained by a method for profiling and solving space mission problems. The method includes creating a space mission analysis scenario, and setting up a control sequence that simulates a problem to be solved in the space mission. The method further includes selecting control variables to be checked in solving the problem, and identifying parameters to be used in defining a desired results that represents an adequate solution to the problem. Additionally, the method includes establishing profiles for each particular sub-problem of the problem to be solved, and running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

Others of the above objects are obtained by a computer system embodied according to the present invention. The computer system is adapted to perform profiling and solving space mission problems for which a space mission analysis scenario has been created. The system includes a processor and a memory that is addressable by the processor. The memory includes software instructions adapted to enable the computer

system to perform a number of steps, including setting up a control sequence that simulates a problem to be solved in the space mission, selecting control variables to be checked in solving the problem, and identifying parameters to be used in defining a desired results that represents an adequate solution to the problem. The software instructions are also adapted to enable the computer system to perform steps of establishing profiles for each particular sub-problem of the problem to be solved, and running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

Still others of the above objects are obtained by a computer program product embodied according to the present invention. The computer program product enables a computer to perform profiling and to solve space mission problems for which a space mission analysis scenario has been created. The computer program product includes software instructions for enabling the computer to perform predetermined operations, and a computer readable medium embodying the software instructions. The predetermined operations include the steps of setting up a control sequence that simulates a problem to be solved in the space mission, selecting control variables to be checked in solving the problem, and identifying parameters to be used in defining a desired results that represents an adequate solution to the problem. The predetermined operations also include steps of establishing profiles for each particular sub-problem of the problem to be solved, and running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates an example, according to an embodiment of the present invention, of a GUI panel used for selecting components used in defining desired results (i.e., goals) for a given problem.

Fig. 2 illustrates an example, according to an embodiment of the present invention, of a user specifying desired values for the goal elements of a mission.

Fig. 3 illustrates an example, according to an embodiment of the present invention, of profiles being added and being re-ordered

Fig. 4 illustrates an example, according to an embodiment of the present invention, of the Target Sequence window showing that three profiles have been defined for the space mission scenario.

DETAILED DESCRIPTION OF THE INVENTION

According to one embodiment of the present invention, a software program employs a graphical user interface (GUI) to allow the user to set up a series of sub-problems of any desired level of complexity. The program then implements the series automatically and sequentially, incorporating the solution to one sub-problem into the input to the next.

According to a preferred embodiment of the invention, the process claimed herein is carried out in the context of an existing space mission analysis software program, such as the Astrogator module of the Satellite Tool Kit (STK) program produced by Analytical Graphics, Inc. of Malvern, Pennsylvania. The technical literature for the Satellite Tool Kit program is incorporated herein by reference in its entirety, for all purposes.

Using an intuitive GUI, the invention is embodied to allow the analyst to specify different problems in the form of a set of profiles. Each profile comprises one or more selected target variables and one or more desired results. The user can select any given

profile and have the program solve the associated problem. In addition, the user can specify a series of two or more profiles and have the software process them sequentially, as described above.

For example, using the STK Astrogator module, the analyst first creates a space mission analysis scenario. Within that scenario, the analyst sets up a control sequence that simulates the problems to be solved. The invention then allows the analyst, through a GUI, to select all the possible control variables that will be checked in solving the problems and to define components to be used in defining desired results that represent adequate solutions to the problems.

Once the control variables are selected and the desired results are specified, the analyst proceeds to the profiling of each particular sub-problem. Using a GUI panel specifically designed for this purpose, the analyst creates a profile specifying which of the previously selected controls should be varied, and what results should be achieved. The analyst can then use the invention to specify as many different profiles as needed, each with its own lists of controls and desired results.

The analyst can also flag each profile as active or inactive, directing the software program to run only those that are currently active. Since profiles and sequences thereof can be saved together with the space mission analysis scenario, this is a convenience to the analyst in the event that work must be re-run at a later date.

Once the profiles have been specified, the user can command the software via the GUI to run the profiles. After each profile is run, the invention collects the solution to the profile, and applies it as the initial starting point for the next profile (if appropriate).

The invention also allows the analyst to specify many different sets of profiles for different sub-sequences that make up the overall sequence. The invention further allows

one or more sets of profiles to be automatically run as part of another set of profiles. In other words, in running a given sequence that is being investigated as part of a set of profiles, it may be necessary to run a different set of profiles as part of that sequence. The invention allows this "nesting" of profile sets.

When profiles are nested, the invention also allows the analyst to select a desired result of an inner profile to be used as a control variable in an outer profile. It also allows the solution of an inner profile to be used as a result of an outer profile.

As noted above, the present invention is a series of modules running on a computer system to accomplish the mission analysis described. The present invention is implemented via a general-purpose computer.

Referring to **Fig. 1**, the illustrated GUI panel is used for selecting components used in defining desired results ("goals") for a given problem. The Targeted Goal Setup screen **16** allows a user to establish goals and results for a given profile. A series of available "components" are displayed for the user in an "Available Components" window **10**. This shows a user all of the components that are available for the user to specify, for example Eccentricity, Latitude, Altitude and all other components that a user might wish to vary in performing mission planning and analysis. Placement buttons **18** allow the user to select the components that the user wishes to vary.

When the user selects a component, it is transferred to a "Selected Components" window **12**. Here the user can highlight the selected components for subsequent manipulation or specification. Alternatively, the user can de-select a component using the placement buttons **18**.

When a user highlights a component in the component "Selected Components" window **12**, the details and values associated with the selected component are displayed in a "Component Details" window **14** where they can be specified or modified.

Referring to **Fig. 2**, the screen for allowing a user to specify desired values for the goal elements and to determine which are to be used in a given profile is shown. Variables **20** are displayed for the user, as are goals **22** which can be specified by the user for various selected components. Goal elements **24, 26, 28** used in the given profile are marked with an 'x'. Note that in this example, a value is defined for the element of eccentricity, but that element is not used in the profile.

Referring to **Fig. 3**, the screen to add or modify profiles is illustrated. Profiles are added and can be re-ordered if desired in the Add/Modify screen **30** using the GUI of the present invention. Active profiles are marked with an 'x' **32, 34**. In this example, the profile named "Phase-2" is not being run, whereas "Phase-l" and "Phase-3" are being run. This screen also allows a user to edit the profile being run in an Edit screen **36** which allows the user to select the profile to be edited **38**.

Referring to **Fig. 4**. the Target Sequence window **42** is illustrated. The information in this window shows that three profiles **40** have been defined for this space mission scenario.

The system and method of the present invention operates using a number of standard processors known in the art. UNIX processors such as the Silicon Graphics SGI IMPACT™ and SGI 02™, each with the Reality Engine™ or the Infinite Reality™ engine; the IBM RS6000 with Evans & Sutherland Freedom graphics accelerator; the Hewlett-Packard™ HP9000™ with Evans & Sutherland graphics accelerator; the Sun Microsystems SPARC™ station with Evans & Sutherland Freedom graphics accelerator;

the Sun Microsystems UltraSUN™ with Creator3D graphics hardware; Digital Equipment Corporation 4D50T and 4D60T processors, may each be used to implement the present invention. Microsoft Windows operating system hardware also can be used to implement the present invention with MS Windows, Windows95, and Windows NT operating systems with or without OpenGL Accelerators. Generally, all of the above systems should also have 48 Mbytes of memory and at least 75 Mbytes of hard drive space available.

A system and method for sequentially profiling and solving problems in space mission analysis has been disclosed. It will be appreciated by those skilled in the art that other variations may be possible without departing from the scope of the invention as disclosed.

WHAT IS CLAIMED IS:

1. A method for profiling and solving space mission problems, the method comprising:

creating a space mission analysis scenario;

setting up a control sequence that simulates a problem to be solved in the space mission;

selecting control variables to be checked in solving the problem;

identifying parameters to be used in defining a desired results that represents an adequate solution to the problem;

establishing profiles for each particular sub-problem of the problem to be solved; and

running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

2. The method of claim 1, wherein the step of running simulations for each of the established profiles comprises:

after each profile is run, collecting the solution to that profile, and, in the event that there is a subsequent profile to be run, applying it as the initial starting point for a subsequent profile; and

collecting the solution to the last profile and providing it as the result representing a solution to the problem to be solved.

3. The method of claim 1, wherein the step of establishing profiles for each particular sub-problem of the problem to be solved comprises:

specifying which of the previously selected control variables should be varied for each particular sub-problem, and

specifying what results should be achieved for each particular sub-problem.

4. A computer system adapted to perform profiling and solving space mission problems for which a space mission analysis scenario has been created, the system comprising:

a processor;

a memory, addressable by the processor, including software instructions adapted to enable the computer system to perform the steps of:

setting up a control sequence that simulates a problem to be solved in the space mission;

selecting control variables to be checked in solving the problem;

identifying parameters to be used in defining a desired results that represents an adequate solution to the problem;

establishing profiles for each particular sub-problem of the problem to be solved; and

running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

5. The computer system of claim 4, wherein the step of running simulations for each of the established profiles comprises:

after each profile is run, collecting the solution to that profile, and, in the event that there is a subsequent profile to be run, applying it as the initial starting point for a subsequent profile; and

collecting the solution to the last profile and providing it as the result representing a solution to the problem to be solved.

6. The computer system of claim 4, wherein the step of establishing profiles for each particular sub-problem of the problem to be solved comprises:

specifying which of the previously selected control variables should be varied for each particular sub-problem, and

specifying what results should be achieved for each particular sub-problem.

7. A computer program product for enabling a computer to perform profiling and solving space mission problems for which a space mission analysis scenario has been created, the computer program product comprising:

software instructions for enabling the computer to perform predetermined operations, and

a computer readable medium embodying the software instructions;

the predetermined operations including the steps of:

setting up a control sequence that simulates a problem to be solved in the space mission;

selecting control variables to be checked in solving the problem;

identifying parameters to be used in defining a desired results that represents an adequate solution to the problem;

establishing profiles for each particular sub-problem of the problem to be solved; and

running simulations for each of the established profiles to provide a result representing a solution to the problem to be solved.

8. The computer program product of claim 7, wherein the step of running simulations for each of the established profiles comprises:

after each profile is run, collecting the solution to that profile, and, in the event that there is a subsequent profile to be run, applying it as the initial starting point for a subsequent profile; and

collecting the solution to the last profile and providing it as the result representing a solution to the problem to be solved.

9. The computer program product of claim 7, wherein the step of establishing profiles for each particular sub-problem of the problem to be solved comprises:

specifying which of the previously selected control variables should be varied for each particular sub-problem, and

specifying what results should be achieved for each particular sub-problem.

ABSTRACT OF THE DISCLOSURE

A system and method for orbital planning allows iterative calculations of orbital parameters to be accomplished in an automated way with one parameter solution serving as input to the next parameter's calculation. A software program employs a graphical user interface (GUI) to allow a space mission analyst to set up a series of sub-problems of any desired level of complexity. The program then implements the series automatically and sequentially, incorporating the solution to one sub-problem into the input to the next.

Figure 1

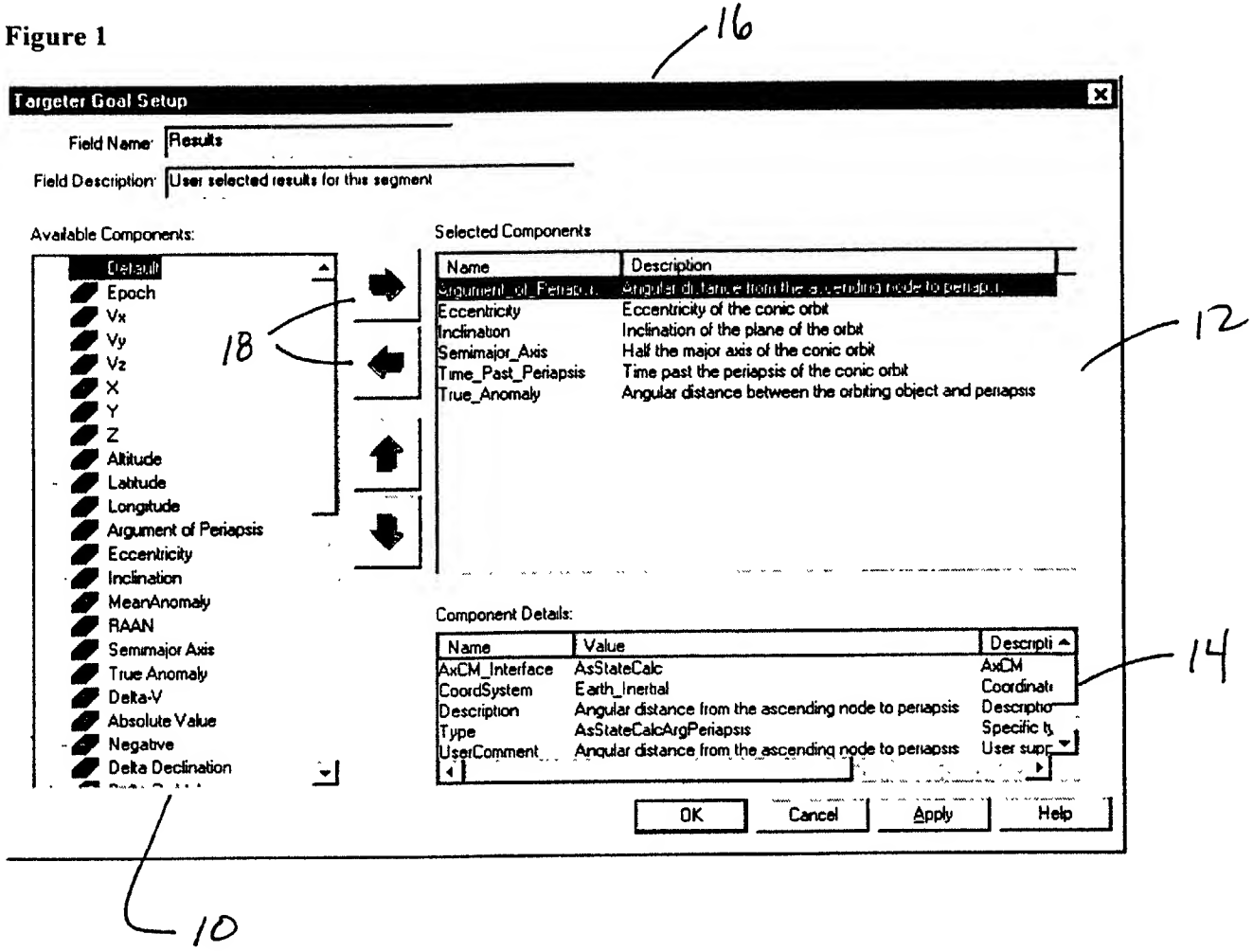


Figure 2

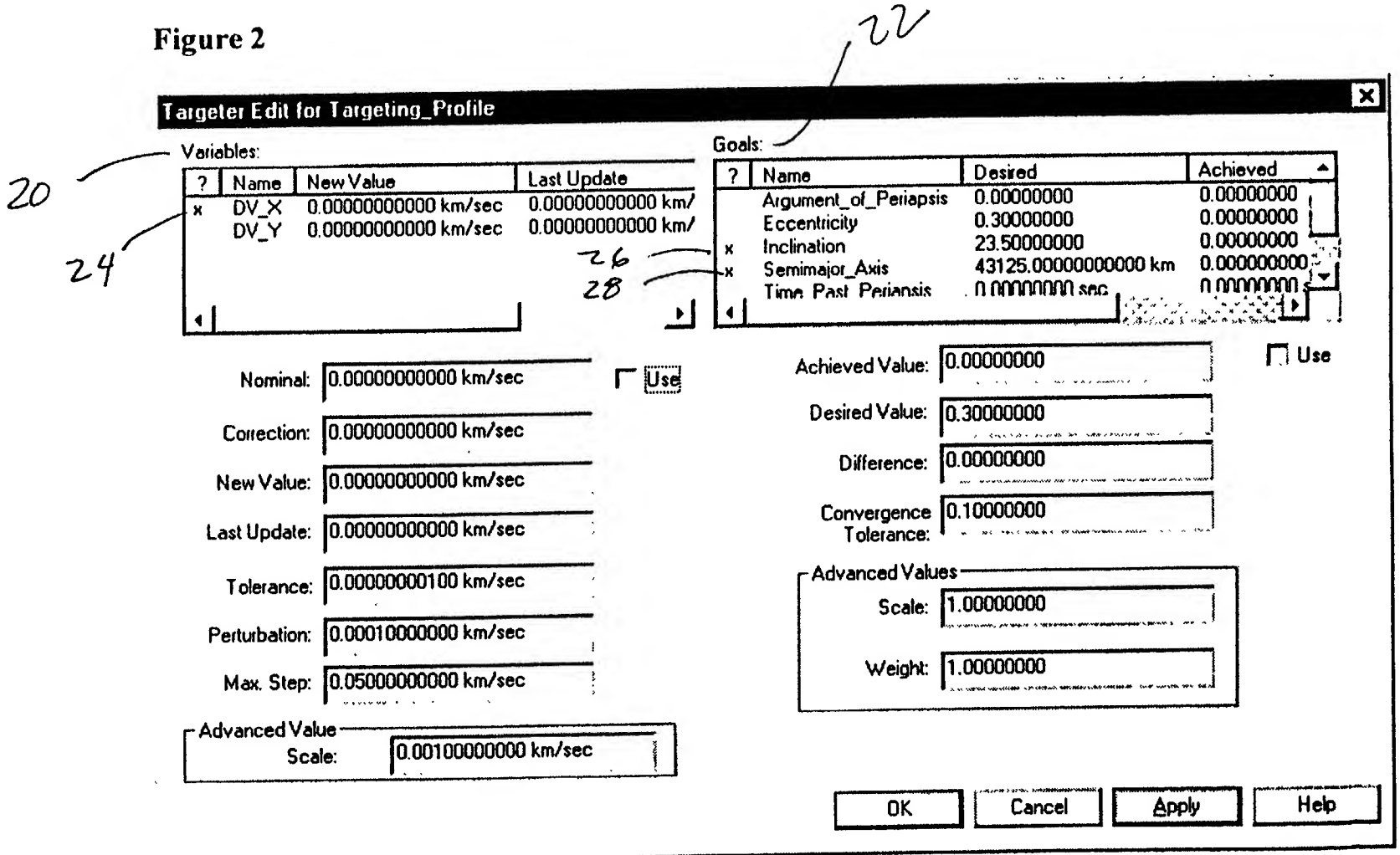
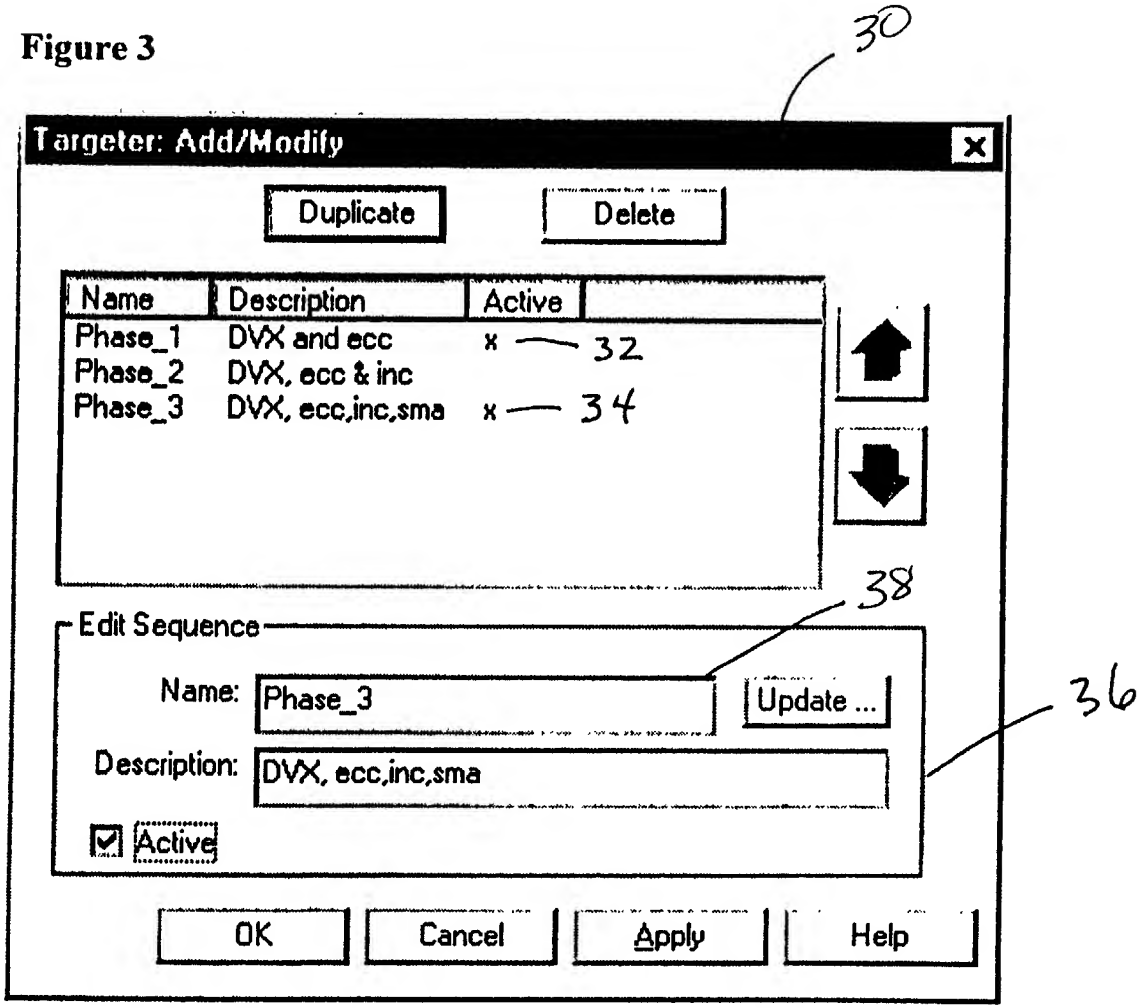

Targeter Edit for Targeting_Profile
Variables:
20
24
? Name New Value Last Update
x DV_X 0.00000000000 km/sec 0.00000000000 km/
DV_Y 0.00000000000 km/sec 0.00000000000 km/
Goals:
22
26
28
? Name Desired Achieved
Argument_of_Periapsis 0.00000000 0.00000000
Eccentricity 0.30000000 0.00000000
x Inclination 23.50000000 0.00000000
x Semimajor_Axis 43125.00000000000 km 0.00000000
Time_Past_Periapsis 0.00000000 sec 0.00000000
Nominal: 0.00000000000 km/sec
Use
Correction: 0.00000000000 km/sec
New Value: 0.00000000000 km/sec
Last Update: 0.00000000000 km/sec
Tolerance: 0.00000000100 km/sec
Perturbation: 0.00010000000 km/sec
Max. Step: 0.05000000000 km/sec
Advanced Value
Scale: 0.00100000000 km/sec
Achieved Value: 0.00000000
Use
Desired Value: 0.30000000
Difference: 0.00000000
Convergence Tolerance: 0.10000000
Advanced Values
Scale: 1.00000000
Weight: 1.00000000
OK
Cancel
Apply
Help

Figure 3


30
Targeter: Add/Modify
Duplicate
Delete
Name
Description
Active
Phase_1
DVX and ecc
x
32
Phase_2
DVX, ecc & inc
Phase_3
DVX, ecc,inc,sma
x
34
38
Edit Sequence
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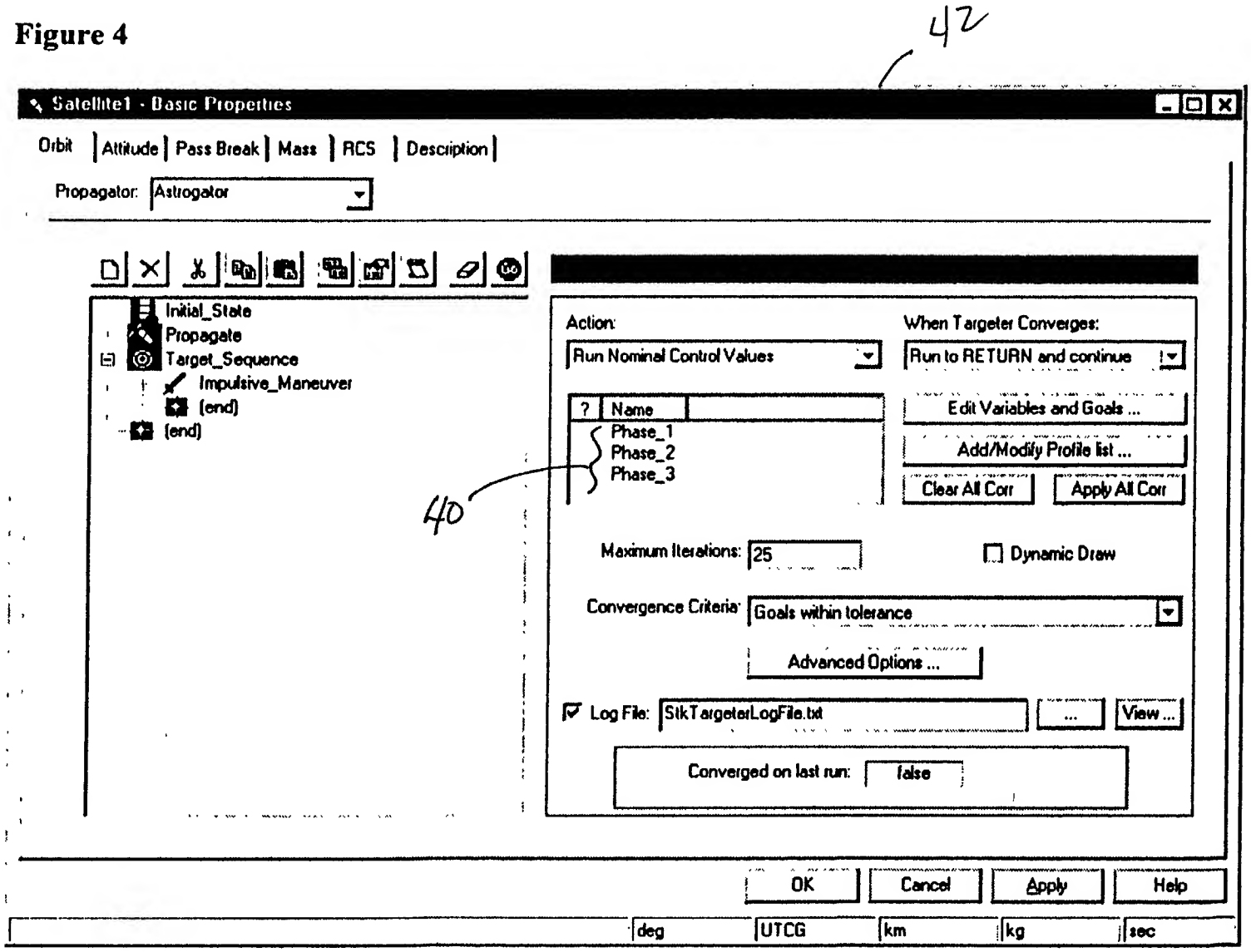
Phase_3
Update ...
36
Description:
DVX, ecc,inc,sma
Active
OK
Cancel
Apply
Help

Figure 4


42
Satellite1 - Basic Properties
Orbit
Attitude
Pass Break
Mass
RCS
Description
Propagator:
Astrogator
Initial_State
Propagate
Target_Sequence
Impulsive_Maneuver
(end)
(end)
40
Action:
Run Nominal Control Values
When Targeter Converges:
Run to RETURN and continue
?
Name
Phase_1
Phase_2
Phase_3
Edit Variables and Goals ...
Add/Modify Profile list ...
Clear All Corr
Apply All Corr
Maximum Iterations:
25
Dynamic Draw
Convergence Criteria:
Goals within tolerance
Advanced Options ...
Log File:
StkTargeterLogFile.txt
...
View ...
Converged on last run:
false
OK
Cancel
Apply
Help
deg
UTCG
km
kg
sec

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of John P. Carrico and Frank T. Stoner

Serial No.: Not Yet Assigned　　Group Art Unit:
Filed: HEREWITH　　Examiner:

FOR: **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS**

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As below inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, joint and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHOD AND APPARATUS FOR SEQUENTIALLY PROFILING AND SOLVING PROBLEMS IN SPACE MISSION ANALYSIS**, the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim the benefit under 35 U.S.C. § 119(e) of United States provisional application no. 60/116,546, filed January 21, 1999.

I hereby appoint the following attorney(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Jon L. Roberts
Registration No. 31,293
John K. Abokhair, Esq.
Registration No. 30,537
Kevin L. Pontius
Registration No. 37,512
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I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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